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ABSTRACTS OF TUBERCULOSIS

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Protecting Power of Atypical Acid-Fast Bacilli.—The existence of a protecting power of certain S variants of tubercle bacilli against a subsequent infection with virulent tubercle bacilli has been demonstrated by several investigators. Even heat-killed avian tubercle bacilli have been shown to be capable of immunizing the rabbit against a severe experimental infection. An organism, isolated from new guinea pigs, treated with the acetone extract of tubercle bacilli was used for a series of these immunizing experiments. Six guinea pigs were given five doses of one mgm. of this new organism, an S variant. Thirty-five days later these animals together with three control animals were inoculated with 0.001 mgm. of a human strain of tubercle bacilli of moderate virulence. All of the control animals showed typical tuberculous lesions at autopsy. Of the six experimental animals one died of pneumonia. Another dead seven months later showed generalized tuberculosis. The remaining four animals died from various causes six to fifteen months later. Two of these guinea pigs showed a slight enlargement of the lymph nodes at the site of inoculation of the immunizing doses. None of the four animals showed any tuberculous lesions due to the experimental infection. A second series of animals received protecting doses of the same organism in the same manner. An infecting dose of 1/80,000 mgm. of a highly virulent bovine strain of tubercle bacilli was then inoculated into these animals and into three control guinea pigs. Unfortunately an epidemic of pneumonia killed most of the animals. Two however lived for about three months after the infecting inoculation. Tuberculous lesions were found in these animals at autopsy but to an infinitely less marked degree than in the control animals which had all died of generalized tuberculosis. This new type of acid-fast bacilli has a marked protective power especially against a not too virulent human strain of tubercle bacilli.—*Sur le pouvoir prémunisant des cultures de bacilles acido-résistants a colonies lisses, isolées des cobayes neufs, J. Valtis & F. van Deinse, Compt. Rend. Soc. Biol., November 21, 1936, cxxiii, 747.*—(*M. T. W.*)

Vaccination of Guinea Pigs with Killed Tubercle Bacilli.—Attempts were made to vaccinate guinea pigs against a tuberculous infection with tubercle bacilli killed in various ways. Fifteen to twenty or more animals were used in each series of experiments with as many animals as controls. The bacilli were killed in various ways and inoculated in various doses. Bacilli were killed by heat at 120°C. for half an hour, 70°C. for one hour, 65°C. for two hours or they were killed with formalin.

They were suspended in both physiological salt solution and in a mixture of lanolin and oil known as Ramon's mixture. The vaccines were administered in varying doses. They were made of two strains of bovine tubercle bacilli, R strain and S variant. Following the vaccination, virulent human and bovine tubercle bacilli were inoculated into the guinea pigs. The experiments brought forth the following facts. Vaccination with dead tubercle bacilli produced a certain degree of resistance which retarded the appearance and extension of the infection into the viscera. This resistance was only appreciable when bacilli of infection of relatively low virulence were used or small doses of highly pathogenic bacilli. Heat killed bacilli appeared to hold their vaccinating properties better than bacilli killed with formalin. Dead bacilli suspended in Ramon's mixture had no immunizing advantage over those suspended in salt solution. The S type of bovine tubercle bacilli seemed to have greater immunizing properties than did the R strain. The intravenous method of administering the vaccine did not give any better results than the subcutaneous method.—*Essais de vaccination des cobayes contre la tuberculose au moyen de bacilles morts, A. Boquet & R. Laporte, Compt. Rend. Soc. Biol., April 17, 1937, cxxiv, 1159.*—(*M. T. W.*)

Bactericidal Effects of Garlic Vapor on *M. leprae*.—The vapors from freshly crushed garlic caused inhibition in the growth of a non-acid-fast yellow strain of *M. leprae* obtained from T. D. Beckwith, a non-acid-fast orange strain from Dr. J. F. Kessell and an acid-fast yellow strain from the American Type Culture Collection. After 32 minutes of exposure the growth was markedly inhibited and practically no growth occurred after one hour's exposure.—*Bactericidal Effects of Vapors from Crushed Garlic on Mycobacterium leprae, R. S. McKnight & C. C. Lindegren, Proc. Soc. Exper. Biol. & Med., December, 1936, xxxv, 477.*—(*F. B. S.*)

Complement Fixation following BCG Vaccination.—Previous complement fixation studies on the serum of tuberculous patients and on immunized and infected rabbits indicate that the S forms of the tubercle bacillus contain antigenic components which are lacking in R forms. The serum from animals thoroughly immunized with S microörganisms fixed on the average twice as much complement with S antigen as with the R antigen, whereas animals immunized with R microörganisms fixed approximately the same amount of complement in the presence of either S or R antigen. The former were described as, having an S/R index of approximately 2, the latter an S/R index close to 1. With this in mind the serums from 11 Indian children who had received live BCG intracutaneously sixteen months before were titrated for their complement fixing powers using S and R antigens in parallel. Ten of these eleven children gave positive skin tests for tuberculin. All gave an S/R index close to 1. This finding indicates that either the BCG bacilli lack the specific S antigen fraction (are R organisms) or, if they do possess it, the specific immunity in the children, as measured by complement fixation, has disappeared. The similarity of the reaction of these BCG-infected children to the reaction of rabbits immunized with heat killed BCG or other R forms of tubercle bacilli, in contrast to the reaction with heat-killed S organisms, lends some support to the previous conclusion that BCG organisms lack the specific S antigenic substance.—*Complement Fixation following BCG Vaccination, G. B. Reed & G. G. Gardiner, J. Immunol., December, 1936, xxxi, 471.*—(*J. S. W.*)

Serum Flocculation for Diagnosis of Activity in Tuberculosis.—An antigen was prepared from ground tubercle bacilli (H37). Two grams of bacilli were placed in 5 per cent phenol for 12 hours, washed once in distilled water, transferred to a mortar with a few cubic centimetres of alcohol and ground for 30 minutes. The bacilli were then ground by steel balls for five hours at the end of which time microscopical examination proved the grinding to be nearly complete. To this was then added 75 cc. of 95 per cent alcohol, the suspension left at room temperature for 3 days, and then filtered through dense filter paper. The resulting extract was clear. In attempting to establish the required concentration of the extract, it was found that 95 per cent alcohol without bacillary substance gave the same results as the bacillary extract. Since occasionally the extract-saline mixture gave a slightly heavier reaction however, both antigens (the specific and the nonspecific) were used in the tests. The serum used in the test must be free from haemolysis and blood cells and not over two days old. Three-tenths cc. of serum is measured into 10 by 75 mm. test tubes and placed in the water bath at 60°C. for 5 minutes. These are then removed and cooled completely. To one tube is added 0.3 cc. of a mixture of 1 part of extract and 3 parts of saline, and to another 0.3 cc. of 1 part of 95 per cent alcohol and

3 parts of saline. The tubes are then shaken for ten minutes at 275 oscillations per minute. A positive reaction consists of distinct floccules evenly distributed in a more or less hazy fluid, and a negative test has a clearer fluid without floccules. In animals, experimentally infected, the test was positive only for a few days after inoculation. By the twelfth day and thereafter, the test was negative in both controls and infected animals. Eight hundred sixty human sera were tested; 685 were from presumably nontuberculous patients; 21 gave positive reactions; 7 were shown to have early active tuberculosis; and the remainder were either in elderly persons or patients with miscellaneous disorders. One hundred seventy-five sera were from tuberculous patients. In 80 per cent the serological findings agreed with the clinical classification. In a comparatively small number of severe and hopeless cases the test had become negative in 50 per cent. Of 54 patients clinically classified as arrested, 49 gave negative results. In tuberculous infections the euglobulin may acquire antigenic properties and combine *in vitro* with antibody. It is presumed that in severe cases great numbers of disintegrated tubercle bacilli and other cell substances possibly enter the circulation to combine with the antibody in the blood-stream. The free antibody may thus be combined and unable to combine *in vitro* with the antigen. This may explain the negative reactions in severe cases. The mechanisms of false positive reactions are generally little understood. They may sometimes be ruled out by repeated tests. The reaction is not constant if it is due to causes other than tuberculosis, except in the case of old age. Evanescent positive tests were obtained following skin testing with Old Tuberculin, colds and pneumonia, and acute alcoholism. —*A Flocculation Method for the Diagnosis of Active Tuberculosis, F. Rytz & G. K. Higgins, Am. J. Clin. Path., May, 1937, vii, 264.*—(*A. E. M.*)

Haematopoietic Tissues in Rabbits with Tuberculosis.—The haematopoietic tissues are in essence mobile, with quasi-fixed portions which serve to manufacture the various cell types that eventually enter into and determine the composition of the circulating blood. The specialization of blood cell production has led to the designation of the following "systems" of haematopoiesis: (*1*) the myeloid system, (*2*) the lymphoid system, and (*3*) the reticuloendothelial system. With the advent of pathological processes extensive alterations may occur in the cellular composition of the blood dependent upon the type of the damaging agent and the resultant changes occurring in the factories that produce the blood cells. Seldom, if ever, is the alteration confined to one cell-type in the blood. In the present report the conditions found in the haematopoietic tissues of experimental animals during the evolution of a fatal type of tuberculosis are discussed and the cellular interplay observed. Rabbits were used for this purpose, infected with either avian or bovine tubercle bacilli. Some of the test animals were vaccinated with heat-killed bacilli before infection. For comparison a small group of rabbits received highly pathogenic *Staphylococcus aureus*. Frequent leucocytic counts were done on the various animals, both prior to and after inoculation. Complete autopsies were done on all of the animals used in the experiments and histological preparations were made of all organs. As representatives of the haematopoietic tissue, samples from the following were routinely examined: (*1*) myelogenous system (femur bone-marrow); (*2*) lymphoid system (spleen, mesenteric lymph nodes and vermiform appendix); and (*3*) reticuloendothelial system (the liver, which is the most important member of this system). The results obtained are reported in considerable detail, difficult to condense. Of interest is the observation that in acute tuberculous infection the spleen and lymphoid tissue of the vermiform appendix are concerned primarily with the production of monocytes. It appears that the primitive cells of this portion of the haematopoietic apparatus differentiate into monocytes. No evidence that the monocyte of the rabbit is produced in the marrow and liver or from "fixed tissue cells" was found. The author does not believe that the differentiated lymphocytes can be transformed into monocytes, but does hold that the primitive cell may be the same for the lymphocyte and the monocyte. The author's Summary and Conclusions follow: *1:* All the systems of the haematopoietic tissue are involved. *2:* The stem cells are greatly increased. *3:* Undifferentiated cells, perhaps stem cells, enter the circulation. These cells retain the ability further to multiply within the circulating blood and also in all probability after entering tissues other than blood-forming. This adds greatly to the uncertainty as to whether a cell in mitosis has arisen *in situ* or in some far removed portion of the haematopoietic tissue. *4:* The cells in the germinal centres of the spleen are probably stem cells which, in acute tuberculosis in the rabbit, differentiate into monocytes. It also seems probable that the pulp cells of the spleen

have the same origin. *5:* It seems probable that monocytes also originate from at least some portions of the lymphoid tissue outside the spleen. *6:* No evidence was found to suggest that the monocyte arises from the marrow or from the reticuloendothelial system outside of the lymphoid system. *7:* The criteria on which the concept of a reticuloendothelial system rests are insufficient to establish such a system. *8:* The circulating blood mirrors the changes found in the so-called fixed haematopoietic tissues, although there may be a lag of several days before changes are reflected. *9:* The interplay of various cell types of the haematopoietic tissue necessitates a consideration of this tissue as a whole in pathological processes where it may play an important rôle. Single observations should be regarded as indicative of a phase in a pathological process rather than as characteristic of the process as a whole.—*The Interplay of the Cells of the Haematopoietic Tissues in Rabbits Infected Experimentally with the Tubercle Bacillus, E. M. Medlar & K. T. Sasano, Am. J. Path., November, 1936, xii, 825 (with ten plates).—(J. S. W.)*

Supervitaminosis C in Tuberculosis.—Daily intraäbdominal injections of 20 mgm. of crystalline cevitamic acid into 10 guinea pigs over a period of 6 months did not protect them against a subcutaneous injection of 300,000 virulent human (H37) tubercle bacilli. The extent of tuberculosis was not significantly less in these treated animals than in control untreated tuberculous animals.—*Supervitaminosis C in Tuberculosis, F. H. Heise & G. J. Martin, Proc. Soc. Exper. Biol. & Med., November, 1936, xxxv, 337.—(F. B. S.)*

Blood Glutathione in Bone and Joint Tuberculosis.—In closed and active forms of bone and joint tuberculosis the total amount of glutathione in the blood is increased, and corresponds to the seriousness of the process. As the closed form of bone and joint tuberculosis becomes worse the amount of reduced glutathione in the venous blood, and even to a greater extent of oxidized glutathione, increases. The glutathione coefficient (glutathione in mgm. per cent/erythrocytes in millions) is increased in bone and joint tuberculosis.—*Glutathion des Blutes bei Knockengelenktuberkulose, M. M. Altschuler, Acta Tuberc. Scandinav., 1936, Fasc. 4, x, 370.—(F. B. S.)*

Cholesteraemia in Tuberculosis.—The amount of cholesterin in the blood has no diagnostic value in pulmonary tuberculosis, but it is of definite value in prognosis. In a group of 217 tuberculous patients whose blood was examined for cholesterin, 39.63 per cent gave normal values, while 51.61 per cent showed hypocholesteraemia and 8.75 per cent had excess of cholesterin. Fifty-seven per cent of those with fibrous forms of tuberculosis showed hypercholesteraemia, while in the group with progressive, febrile and toxic tuberculosis, 94 per cent showed hypocholesteraemia. Pneumothorax increases the amount of cholesterin in those patients in which it is low, and fixes it in those in whom it is normal. Patients treated with artificial pneumothorax who were doing well presented normal amounts of cholesterin in 88.47 per cent of cases. Among 102 patients with fever, only 5.88 per cent showed normal cholesteraemia. Women with quiescent tuberculosis during pregnancy have hypercholesteraemia. If the amount of cholesterin diminishes after childbirth, the lesion is progressing. No relation could be determined between the amount of cholesterin in the blood and the red cell sedimentation rate.—*La colesterina en la tuberculosis pulmonar, G. Eyzaguirre, Crón. Méd., Lima, February, 1936, liii, 53.—(J. R. P.)*

The Monocyte-Lymphocyte Ratio in Avian Tuberculosis.—Guinea pigs, rabbits and fowls were infected in various ways with a virulent S and an avirulent R variant of an avian bacillus. The total leucocytic count, the monocyte-lymphocyte ratio, the sedimentation rate of erythrocytes and the red-cell count and the haemoglobin were determined and correlated with the developing lesions, and the progression or regression of the disease. It was found that the progressive anaemia, the increased sedimentation rate and the increase of the monocytes over the lymphocytes accurately reflect the progression of the disease. The virulence of the S variant of the avian bacillus for these animals is reflected in the persistent bacillaemia in the chicken and rabbit, and the transient bacillaemia in the guinea pig. The relative avirulence of the R variant for these animals was also reflected in their blood picture, which was only transitorily altered and soon returned to normal. Hypersensitivity to Old Tuberculin develops in these animals on parenteral administration of both the S and R variants, though it is more intense following the administration of the S variant. In both instances it persists after the disappearance of macroscopical tuberculous lesions. The monocyte-lymphocyte ratio is a more accurate index of the pathological process than the sedimentation rate of the erythrocytes.—*Blood Changes in Experimental Tuberculosis. I. Correlation between the*

Tuberculous Process and the Evolution of the Monocyte-Lymphocyte Ratio in Avian R and S Infection, K. E. Birkhaug & T. Guthe, Acta Tuberc. Scandinav., 1937, xi, 1.—(M. B. L.)

Lysozyme in Tuberculous Pleural Fluid.—During a study of staphylococci a single yellow colony was found on an agar plate seeded with staphylococci. It grossly resembled *Staphylococcus aureus*, but consisted of rod-shaped microörganisms. These rods exhibited an extreme polymorphism, occasionally occurring in long filamentous forms. The shorter forms were usually gram-positive, or nearly so, whereas the longer forms were always gram-negative. Neither spores nor flagella could be identified. Attempts to identify this bacillus failed. It was therefore designated bacillus Y. The interesting thing about this bacillus is that it is readily lysed by pleural fluid from tuberculosis patients. If one cc. of a heavy opaque suspension of these bacilli in physiological salt solution be mixed with equal parts of pleural fluid, within a few minutes the mixture becomes progressively clearer, until after a varying length of time, even as soon as 10 minutes, it becomes completely clear, as clear as the pleural fluid itself. After complete clearing has occurred new bacilli may be added and clearing will again take place, but eventually the clearing capacity becomes exhausted. All serous fluids from tuberculosis patients that were tested (about 20) showed lysis. The highest dilution causing lysis varied from 1:4,000 to 1:10,000. The lytic titre of these fluids showed no parallelism with their agglutination titre for *Staphylococcus aureus*. Heating in the water bath for one hour at 58°C. prevents the reaction, while incubation temperature for 24 hours does not affect the lytic titre. Killed bacilli are lysed by some fluids and not by others. One serous fluid from a patient with pulmonary carcinoma did not cause lysis. Microscopically lysis showed the bacilli to be gradually replaced by their shadows. Finally, only a perfectly amorphous, detritus-like mass and some darkly stained granules, similar to large staphylococci, are left. Dilution, of course, affected the speed of lysis, but there was no noticeable difference in the susceptibility to lysis between old and young colonies, nor between agar and broth cultures, nor between substrains of different colony morphology. Tubes containing pleural fluid and bacilli in which lysis appeared to be complete would, at times, show a secondary clouding consisting of a pure growth of Y. The use of nutrient broth as a diluent instead of salt favored this condition. Following the lysis there was a period during which the lysate was apparently sterile, growth occurring again after a three day period. The resistance of the bacilli to the lytic agent was slightly increased by using several generations of "last survivors," but a totally refractory strain was never developed. Pleural fluid was absorbed with tubercle bacilli, with Y and with *Staphylococcus aureus*. While the staphylococcus agglutinins were completely or almost completely removed by homologous absorption, the lytic principles for Y were uninfluenced by any of these absorptions. Human blood serums, both from normal and tuberculous subjects, were found to lyse Y. All of these lysed Y in dilutions up to 1:20, and some in dilution as high as 1:400. Inactivated serums were as active as the unheated ones. Several dissociates were obtained from the original yellow and smooth strain. Unpigmented and rough dissociates were observed to arise from the original yellow and smooth strain: the former were obtained exclusively following lysis; the latter, while occurring more frequently in the secondary growths following lysis, occasionally occurred in routine transplants. The lytic action described is undoubtedly due to lysozyme. For the phenomenon of secondary growth survival must be assumed, otherwise secondary growth could not occur; but it is apparently survival through an altered biological phase during which propagation does not take place on ordinary media. It seems likely that some of the bacilli are transformed into granules which later regenerate bacilli.—*Lysozyme. The Occurrence of an Apparently Sterile Phase; the Relation of Lysis to Dissociation, M. Pinner & M. Voldrich, J. Infect. Dis., January–February, 1937, lx, 6.—(J. S. W.)*

Value of Negative Tuberculin Test.—Lindborg, of Sweden, has recently cast doubt on the reliability of this test by reporting 11 instances among a follow-up of 66 negative reactors in doubtful cases of active pulmonary or hilar tuberculosis in a Swedish sanatorium, of subsequent development of the disease, 5 within a year, considered indisputable evidence. He cites other corroborative reports from the United States and a number from various veterinary sources. On the other hand, support of Koch's early statements came from similar sources, for example, Voges and Eber. Voges studied only the error among positives, which he put at 2.78 per cent. Eber, considering also negative, obtained an average of error of 13.14 per cent, Bang 9 per cent. Eber, after a study of the discrep-

ancies, concluded that if properly applied the proportion of error should be reduced to 2 or 3 per cent. It is now recognized that a reaction may not be elicited in certain advanced or acutely febrile cases and also some with extensive but asymptomatic disease. In Lindborg's most striking case information is insufficient. It is therefore concluded that the evidence is insufficient to disturb confidence in the reliability of the test under proper conditions for the purpose of ascertaining absence of tuberculous infection or biological cure.—*Value of the Negative Subcutaneous Tuberculin Test, R. Carswell, Brit. M. J., May 10, 1936, no. 3932, 990.*—(*A. P.*)

Diagnosis of Cavities by Tomograph.—When tuberculosis schemes were started in Great Britain under the National Health Insurance Act of 1911, the difficulties confronting tuberculosis officers in arriving at accurate diagnosis were enormous. There were then few sanatoria and no dispensaries equipped with X-ray apparatus. After the War many advances were made and the introduction of artificial pneumothorax made adequate X-ray facilities imperative. Also there was a notable improvement in the general standard of pictures and with the development of thoracic surgery there has been an incessant demand for still better technique. It is here submitted that the new method of tomography presents a further advance in X-ray technique and is of special value and interest in defining cavities which may be obscured from direct vision in the usual flat films. It is not sufficiently realized that only about 40 per cent of lung substance is unobscured in X-ray photographs and that any interpretation must take into account the fact that what we see is the sum total of all the shadows within the effective cone of the rays. When two or three pathological processes, in addition to bones, are superimposed, there must be confusion. Post-mortem examinations often reveal cavities, especially small ones, and posteriorly located, which were never even suspected in the best X-ray films. The tomograph, described by Chaoul, Grossman and others, can take actual sections of the chest at any level, three ordinarily sufficing, although it is possible theoretically to build up a cavity synthetically by taking a large number of cross-sections. Rib shadows are almost eliminated and the sternum and vertebral column are not shown as bony structures at all, because of the simple but ingenious device of allowing the tube and film holder to move in contrary directions during the exposure of normally one second. The tube and film describe an arc of about 45° during exposure, which ensures that all objects in the plane photographed are reproduced in the film and those outside it projected away. Mechanical adjustments make possible sections from 3 mm. to 3 cm. in thickness and a stationary flat film is also possible. A case is cited, and roentgenographic and tomographic illustrations reproduced, of a patient admitted to Preston Hall in March, 1936 with advanced pulmonary tuberculosis, having had previous treatment and relapsed. A chain of cavities was visualized on the right in the tomogram but not in the ordinary film, while what was thought to be a large cavity in the left upper appeared in the tomogram to be a localized pneumothorax with adhesions to the chest-wall. Lateral views are more difficult to read, not because of blurring, present in all tomographs, but because of the new orientation involved. A short experience at Preston Hall has emphasized and impressed the value of tomography especially in connection with surgical treatment of pulmonary tuberculosis.—*The Diagnosis of Cavities in Pulmonary Tuberculosis by Means of the Tomograph, J. B. McDougall, Tubercle, July, 1936, xvii 452.*—(*A. P.*)

Internal Linear Shadows in Soft Tissues on Chest Films.—Two groups may be distinguished in respect to the internal linear shadows in the apices and lung fields: (*1*) accessory shadows which run parallel to the ribs, and (*2*) shadows of the intercostal borders which are perpendicular or oblique to the ribs. The former are produced by roentgen rays which strike the soft tissues tangentially in the region of the costal margins. Therefore these shadows represent the undulation of the borders of the pulmonary soft tissues. By the use of schematic drawings and of a model it can be shown that by the displacement of a soft tissue layer within the realm of the tangential surface of the costal margin by about 24 mm. to 4 mm. a layer of increased absorption of roentgen rays results that is sufficient to cast linear shadows. The shadows of the intercostal margins are due to the fact that roentgen rays reach areas of pulmonary tissue which are located between the ribs in a tangential direction. In certain projections they approach the contours of the diaphysial shadows of the ribs and may therefore become similar to the previously described accessory shadows. It is of a great value to understand these accompanying shadows on chest films and to distinguish the accessory linear shadows from actual pleural

thickening.—*Die linearen inneren Weichteilschatten der Thoraxaufnahmen, W. Zawadowski, Fortschr. a. d. G. d. Roentgenstr., October, 1936, liv, 420.*—(*F. G. K.*)

Technique and Interpretation in Chest Roentgenography.—These principles are considered fundamental: (*1*) The best chest exposure is that best showing the anatomy. (*2*) The entire chest and axillary folds should be included. (*3*) Economy of time and money must be considered. Dunham uses 14 x 17 inch films but places the shorter length vertically and the longer horizontally. The larynx should be at the top of the film if the apex is to be adequately exposed and the principal ray must pass through the spine and between the ends of the clavicles. The scapulae should be thrown forward by the patient placing his hands in the location of the trowser pockets (not hip pockets) with elbows and shoulders thrown forward. In taking stereoscopic films the first principal ray passes through the fourth dorsal vertebra between the clavicles, the second four inches lower. Ordinarily only one metre distance is used. For a child, one-thirtieth second, an adult one-twentieth, an exceptionally large adult (over 200 pounds) one-tenth second, is standard. Some tubes take good films at 40 MA., others require 100 MA. Screens are used. The patient is carefully controlled. The bony framework should be noted, especially anomalies such as forked ribs, seventh cervicals and absence of the first dorsal. Heart, aorta, trachea and pulmonary arteries are noted. The last must be distinguished from obscure hilum densities. Calcific hilum deposits are a normal finding in adults. Observation of the diaphragm and costophrenic angles is important. The trunks and linear markings are produced by the bronchi, pulmonary arteries and veins, and their connective tissue support. The "dead area" to the stethoscope is under the shoulder and this is well visualized by X-ray. The "dead area" to the X-ray is the mesial border near the spine, which is easily accessible to percussion and auscultation. Abnormalities are recorded by densities in relation to the normal or by associated distortions and dislocations. However, a film showing few or no abnormal markings may be that of a very pathological lung, for example, bronchiectasis. Miliary tuberculosis is recognized by the even fine dotting although children may develop severe symptoms before the miliary tubercles show on the film. In the adult, anthracosis must be distinguished and certain fine widely distributed types of bronchopneumonia. Pneumonic tuberculosis cannot be diagnosed from films alone. The density may be in any lobe. Carcinoma may cause a similar density. As tuberculous pneumonia will cavitate, collapse therapy is wise as soon as the diagnosis is confirmed. The history and the presence of bacilli in the sputum are most important. The common type of adult tuberculosis is known as fibroid, apical, or nodose. It varies from small areas of lobular pneumonia to massive densities in both lungs. These lesions consist of conglomerate fans or cones, some consisting of dense fibroid tissue, some of acute inflammatory reaction. Cavities, caseous pneumonia, emphysema and pleurisy are common complications. However, in tuberculosis the lesions confine themselves to the anatomical structure of the lung, quite differently from malignancy. Emphysema can be recognized by increased width between ribs, low diaphragm and abnormal spread of trunks, and on fluoroscopy by areas of illumination about the heart shadow on inspiration; the attendant disability, however, is to be determined clinically. Several roentgenographic reproductions accompany this paper.—*The Technique and Interpretation of the Chest Radiogram, K. Dunham, Tubercle, American Section, June, 1936, xvii, 406.*—(*A. P.*)

Tomography.—This method of chest roentgenography developed in Berlin, Germany, consists in the ability to represent in the X-ray picture sections and layers of any thickness and at any depth, eliminating superimposed or overlapping shadows located in different planes. Bocage in 1921 suggested picturing sections by coördinated movement of X-ray tube and film plate carrier around the object, making it possible to have X-ray shadows of all points of a plane fall on the same spot during the period of movement. Chaoul and Grossmann, of the Charité Hospital, Berlin, designed the apparatus now constructed by the Sanitas Company, Berlin, consisting of a double-armed pendulum revolving around a horizontal axle. On top of the pendulum is the tube focus, on bottom the film carrier. When the pendulum swings through its arc, the body layer at the height of the axis of revolution appears clear, while structures above or below are blurred. Raising or lowering the pendulum alters the layer visualized. The time required is from one to several seconds. The makers and distributers of the Tomograph are the Sanitas Electro Medical Company, Friedrichstrasse 131, Berlin N24. The method is comparatively new but may become very useful in demonstrating obscure pathological changes

in lungs, bronchi and blood vessels. Cavities are particularly well brought out.—*Tomography. Report on a Method of X-Raying Sections of the Body, J. W. Craig, Brit. J. Tuberc., July, 1936, xxx, 152.*—(*A. P.*)

Tomograph in Pulmonary Tuberculosis.—Certain markings on X-ray films are difficult to identify and interpret, even when the technique is faultless and the markings of larger vessels and bronchi obscure much lung tissue, so that even in the anteroposterior view not more than about 40 per cent of lung tissue is clearly visible if we consider also obscuration by superimposed shadows of the bony thorax or mediastinal contents. Even the existence of cavities may be in doubt. Oblique and stereoscopic films may help but the former necessitate distortion of the image and very expert interpretation while stereoscopic views are considered by some altogether misleading; also some men cannot visualize stereoscopically. The greatest difficulty is met with in cases where thoracoplasty has been performed. Here the usual flat film, especially in old cases, shows no details of much use in deciding future action, a general diffuse density obscuring the entire field. However, an apparatus, the tomograph, has been evolved by Chaoul and Grossmann on the basis of earlier work by Bocage, Bartelink and Ziedses des Plantes, which supplies much information previously impossible to obtain. The object of the instrument is to take a section of lung tissue at a given point with a view to eliminating denser structures above and below the section. The tube and plates are so connected that they can be revolved around a horizontally placed axis. The patient lies on the table and the tube focus can be made to move by electrical adaptation in an arc from left to right while the film simultaneously moves from right to left but always parallel to the surface of the table and the plane of the section. As the projection of the object falls on the same point of the film in all phases, it will be fully defined at the end of the tube swing. Objects outside of this plane, however, will not be represented at all. Further, since the pivot is movable the plane of section can be varied according to the depth desired. For practical purposes three tomograms suffice for accurate diagnosis, the first section being through the chest at a distance of 7 cm. from the anterior wall, the second at the level of the hilum and the last at about 7 cm. from the posterior wall. The apparatus has a double column steel tube stand holding tube and plate, fitted with an axle pin around which the frame guiding the coördinated movements revolves. The lower part of this frame carries the apparatus for the cassette and Bucky diaphragm. The patient is laid on the table over the cassette and the axle pin brought to the desired height by adjustment. The apparatus is set in motion by pressing a button and the tube and cassette then gently swing in opposite directions. A further adjustment controls the extent of the arc traversed. The minimum exposure is one second for section photographs but ordinary X-ray films can be taken as well. The apparatus is useful in cases of suspected bronchiectasis and the clarity with which it reveals blood vessels and bronchi is of advantage. It is likely however to be of most value in the diagnosis and treatment of pulmonary tuberculosis. Illustrative X-ray reproductions by this method are shown.—*The Tomograph: Its Use in Pulmonary Tuberculosis, J. B. McDougall, Lancet, July 25, 1936, ccxxxi, 185.*—(*A. P.*)

Uveoparotitis.—The description in 1909 by Heerfordt of Copenhagen of *febris uveoparotidea* called attention to a condition increasingly frequent of late years. The best concise definition, however, is that of Garland and Thomson, who described a "definite clinical entity characterized by bilateral uveitis and parotitis, pursuing a chronic course with a . . . tendency to spontaneous recovery." The condition, attributed by Heerfordt to mumps, has also been ascribed to syphilis, beri-beri, oral sepsis, diphtheria and pseudoleukaemia. Lehmann recognized tuberculosis as a cause and since the publication of Garland and Thomson this view has been most widely held. However, the evidence is far from complete. Lewis, Raines and Stewart believe there is no single invariable aetiological agent. *Case record:* A railway clerk, aged 50, had a father who died of pulmonary tuberculosis when he was 13. There was no past history of allergic manifestations. In July, 1934 he had a carbuncle of the right upper lip and right-sided pleural pain and became acutely ill. Right lower lobe pneumonia developed and on August 23, 1934, was still unresolved when he was admitted to the Hull Royal Infirmary, his carbuncle having improved under massive doses of collosol-manganese intramuscularly. Chest X-ray films showed an inert right diaphragm and collapsed lower lobe. Exploratory puncture revealed no fluid. The *fundi oculi* were then normal. In October there was swelling of the legs

resembling angioneurotic oedema, persisting intermittently, also dyspnoea on exertion. On April 17, 1935, there was slight bilateral parotid swelling and elevation of temperature, subsiding. Three days later an iritis developed in the right eye. It was characterized by a fine pigmentary deposit in the anterior capsule with vision reduced to mere perception of light. Heat and atropine resulted in gradual resolution and by September vision was almost normal. Ophthalmoscopy showed cavernous atrophy of the right optic nerve with constriction of the visual field on the nasal side and marked contraction of color vision for red. In January, 1936 there were still persistent signs at the base of the right chest and a Mantoux test was strongly positive. The ophthalmic findings are of peculiar interest. The parotid swellings preceded visual symptoms. It is not believed that tuberculosis was the cause as secondary or "paratuberculous" lesions are predominantly of exudative type. Collis and Lewis do not even believe that erythema nodosum is invariably due to tuberculosis but that other bacterial allergens may play a part, for example, streptococcus. Biopsies, where performed, have not been conclusive, and guinea-pig inoculations have nearly always been negative. The pulmonary lesion, whatever its nature, may have been unrelated to the uveoparotitis.—*Uveoparotitis, G. E. Lewis, R. Raines & D. S. Stewart, Lancet, November 21, 1936, ccxxxi, 1204.*—*(A. P.)*

Uveoparotid Tuberculosis.—Heerfordt, in 1909, described the clinical syndrome—inflammation of the uveal tract, swelling of the parotid glands, and low grade fever—and reported 3 cases. However, he was probably not the first to describe the condition, as in 1904 Cutler reported a case of painless bilateral parotid swellings, enlargement of lachrymal and submaxillary glands, and involvement of the uveal tract, which he considered similar to Mikulicz's syndrome. There have been several subsequent reviews, the last, by Garland and Thomson, being very comprehensive. Although syphilis, leukaemia, and mumps have been suggested as causes, the evidence strongly favors tuberculosis. While the picture is uncommon it is probable that many cases have escaped attention, being wrongly diagnosed mumps. *Case Report:* A healthy looking girl of 17 was seen at Huddersfield Royal Infirmary, Yorkshire, England, complaining of "cold" in the right eye for a week. She gave a history of *tabes mesenterica* in infancy, for which she was hospitalized two months. At the ages of 6 and 10 she was kept out of school for a year because of poor health. Her paternal uncle died of pulmonary tuberculosis, apparently without definite contact, and the father has chronic cough and sputum with calcified lymph nodes on X-ray at both lung roots. Physical examination showed some pallor. The eyes showed a marked iridocyclitis with posterior synechiae and exudative deposits on the anterior surface of the lenses. Slit-lamp examination showed numerous tuberculous nodules in the irides and a densely punctate keratitis. Both parotid glands were swollen and nodular and biopsy of a section of the right showed tuberculous granulation tissue. X-ray examination of the abdomen showed definite calcified tuberculous lymph nodes. The lungs showed persistent fine post-tussive râles in the left subapical region and X-ray examination showed bilateral diffuse mottling and increased hilar shadows. Sputum examination was negative on direct examination and animal inoculation for tubercle bacilli. The intracutaneous tuberculin test was positive. The parotid swellings subsided in the course of four or five months but the temperature curve was intermittently subfebrile, usually 99°F. to 99.4°F. by mouth. The iridocyclitis also cleared up during her stay in the institution under general tonic and hygienic treatment. It seems evident that tuberculosis was the aetiological factor and the case adds further support to the contentions of Garland and Thomson.—*Uveoparotid Tuberculosis, F. Gamm & R. S. Illingworth, Lancet, August 1, 1936, ccxxxi, 245.*—*(A. P.)*

Tuberculosis and Ocular Disease.—Obviously tuberculous pathological entities of the eye are not discussed, but rather lesions the aetiology of which has been disputed. An outstanding example is phlyctenular conjunctivitis, also certain types of keratitis, uveitis, and retinitis, and retrobulbar neuritis and central thrombosis. Finnoff's work with living and dead tubercle bacilli in rabbits is cited in which all tissues but the lens proved susceptible of infection. He apparently produced active lesions also by injection of dead bacilli. Ohmart found that in animals previously sensitized by infection the disease ran a more active and rapid course. O'Rourke was able to produce epithelioid tubercles by injecting certain extracts of the tubercle bacillus into the carotid artery of rabbits. These were lipoproteins, the residue being highly toxic and producing violent inflammations of the eye. Goldenburg, in examining 1,073 cases of authenticated tuberculosis, found only 7 with disease of the iris and 19

with fundus changes possibly due to tuberculosis. Meller, on the other hand, impressed by the improvement of many cases of uveitis under a course of tuberculin, believed he could make out by X-ray other evidences of tuberculosis in the chest. The crowning proof of the tuberculous nature of a uveitis consists of a focal reaction in the eye together with a general reaction after subcutaneous injection of tuberculin. Short of biopsy, this is the only certain method of establishing the diagnosis. The skin test, especially the Mantoux, is chiefly of negative diagnostic value in the adult. Verne's serum flocculation test is an empirical reaction based on observation of the behavior of serum containing tuberculosis antigen and is probably of diagnostic value within limitations, as suggested by Mummery's findings in various eye conditions at St. Mary's Hospital, London. The tubercle bacillus is notoriously hard to find and has not thus far been discovered in phlyctenulae, though they have been found in the perivascular sheath of a retinal vein of an eye excised for perivasculitis. We do not know much about tuberculous toxaemia and its differentiation. Regarding allergy, the experiments of Rich and Lewis and others at Johns Hopkins Hospital lead us to consider tuberculin hypersensitiveness as a change in the body cells whereby the products of the breakdown of tubercle bacilli are converted into powerful irritants and poisons with no apparent increase in immunity. In such cases, administration of tuberculin may be of benefit by decreasing the allergy. The disintegration of tubercle bacilli sets free tuberculoprotein and the patient, being hypersensitive, may develop an allergic tuberculotoxic eye lesion.—*The Tubercle Bacillus as a Cause of Obscure Disease of the Eye, F. A. Williamson-Noble, Brit. M. J., November 7, 1936, no. 3957, 907.*—(*A. P.*)

Tuberculosis of Bone in Ancient Egypt.—The bones from the tombs of Ancient Egypt offer interesting evidence of disease. A study of 4100 vertebrae, the remains of 274 spinal columns which were discovered during excavations at Hierakonpolis, and which are attributed to the Predynastic Epoch, reveals evidence of healed tuberculosis and such other diseases as myeloma, osteo-arthritis, spondylitis and osteomyelitis, probably due to *B. typhosus*. This evidence of tuberculosis places the first known case of this disease at a much earlier date than was formerly known, since Ruffer had interpreted tomb carvings of the 11th, 12th and 13th dynasties as the earliest evidence of Pott's disease. From this work it appears that, since some of these people lived long after they were able to take care of themselves, the care of the sick must have been considered a social duty even in the Predynastic Period.—*Some Examples of Disease of the Vertebral Column in Skeletons of Ancient Egypt, L. R. Shore, Brit. J. Surg., October, 1936, xxiv, 256.*—(*H. W. H.*)

Treatment of Surgical Tuberculosis by Vaseline Injections.—The author reports 6 cases with para-articular foci of tuberculosis successfully treated by the method described. The patient is prepared in the customary manner and a wide operating surface disinfected with tincture of iodine. If no fistulae are present, the foci are incised and eradicated. After removal of the diseased tissue, the cavity is tamponed with gauze moistened with physiological salt solution. After the haemorrhage stops the cavity is filled with sterile vaseline and the skin partially closed so that secretions may drain away. If a cold abscess or fistula is present it is treated in the same manner. The skin about the wound is covered with a thick layer of vaseline. Over this is placed sterile gauze and cotton batting thicker than the ordinary dressing. A well molded plaster-of-paris dressing is applied. It is not advisable to change the cast before the end of 6 weeks. The method seems very favorable because it takes into account the possibility of secondary infection, vaseline ensures as perfect drainage as can be desired, there is no danger of retention of pus, and the lesion is immobilized in plaster. Secretion is quite marked during the first week but gradually decreases. The addition of codliver oil to the vaseline was no advantage and may be a disadvantage in that some maceration of the skin occurred when it was used.—*The Treatment of Surgical Tuberculosis by Vaseline Injections and Closed Plaster-of-Paris Bandages, V. Jerabek, J. Bone & Jt. Surg., October, 1936, xviii, 851.*—(*L. F. B.*)

Abscess Formation in Ankylosed Tuberculous Hips.—No one method for producing ankylosis of the hip is applicable in every case but the operation must be varied according to the conditions found when the hip joint and surrounding structures are exposed at the time of operation. The methods of Hibbs, Bristow, or Albee alone are not enough to lock the hip and it is advisable, if possible at the same time, to do Ghormley's or some similar operation to steady the head of the femur in the socket. Of 48 ankylosed hips, 18 were spontaneous. In 9 of the 18 cases sinuses persisted after

ankylosis and in one case an abscess developed after 15 years. In 30 cases operation for ankylosis was done. In 6 of the 30 cases, abscesses developed after ankylosis was clinically firm. In 3 of these cases, the bone-flap operation described by Wilson was the only procedure used. Operations to lock the hip should fix the head as well as the trochanter to prevent development of abscesses. Abscesses may develop and sinuses continue when there is clinically solid ankylosis. Solid bony ankylosis is the best result that can be obtained and is least likely to cause subsequent abscess formation.—*The Occurrence of Abscesses from Tuberculous Hips That Are Firmly Ankylosed, Z. B. Adams, J. Bone & Jt. Surg., October, 1936, xviii, 974.*—(*L. F. B.*)

Tuberculous Perichondritis of Ribs.—During the past 15 years at the Ural Institute of Traumatology and Orthopedics, 14 cases of tuberculous perichondritis have been encountered. Ten of these were treated surgically and 4 conservatively. Eight cases healed, 5 have a fistula remaining and 1 died. Although histological studies of rib cartilages show the presence of blood vessels, it would seem that, in tuberculous infection, factors other than vascularization are significant. In tuberculous perichondritis or periostitis, no cavities were found in the rib or cartilage, the lesion being a surface ulcer of greater or lesser extent. Changes in the adjacent soft tissues were more noticeable than in the rib or cartilage and frequently a cavity of appreciable size was located beside the pleura under a slight depression of the rib or cartilage. This supports the opinion that the ribs are affected secondarily, as does the observation that the radiocarpal joint never becomes tuberculous in children under 4 years of age. The joint is entirely cartilaginous up to this age. Tuberculous abscesses of the thoracic wall are frequently located in the *linea parasternalis* or *scapularis*, at the point where the intercostal lymphatics are interrupted by lymph nodes. It appears that the lymph nodes adjacent to the pleura first become infected, following which perichondritis or periostitis occurs. In typhoid chondromyelitis, destruction proceeds from the centre of the cartilage to the periphery whereas in tuberculous disease the lesion extends from the periphery to the deeper lying parts. Operative treatment gives the most favorable results and consists of radical removal of the entire cartilage, thorough evacuation of caseous material followed by closure. In the abscess or fistula stage, conservative treatment is indicated.—*Tuberculous Perichondritis and Periostitis of the Ribs, V. D. Chaklin, J. Bone & Jt. Surg., April, 1937, xxxv, 395.*—(*L. F. B.*)

Internal Spinal Fixation by Wiring.—The earliest references to the use of wire for suturing a fracture is that of Icart in 1775. Since then many studies of various metals have been made with reference to use in fractures and spinal fixation. In the present experimental study the reaction of bone and its surrounding tissues to metals believed to be satisfactory, the mechanical efficiency of such fixation, and the reaction of bone and the surrounding tissue under the conditions created by this procedure, were investigated. Everdur, 96 per cent copper, 3 per cent silicon and 1 per cent manganese, and beryllium copper, 2.25 per cent beryllium, were especially studied. These were compared with copper, magnesium, tin and lead. Rabbits were used. Copper alloy wires inserted through holes drilled in the leg bone and bands of the other metals were wound about the exposed shaft of the bone. A marked inflammatory soft tissue reaction, which later disappeared, was noted several days after operation in the case of copper, lead and tin. Osseous destruction seemed directly related to the development and deposit of metallic salts, being most marked with copper, less with tin and lead, and least with the copper alloys. The copper alloys stimulated osteogenesis. There was little tendency to atrophy and necrosis of bone, and this was found in the earlier specimens. Copper encouraged widespread bone necrosis. Magnesium was absorbed and lead to an atrophy and bone necrosis as did tin. Lead was indifferent, tending to inhibit normal periosteal proliferation, thus leading to necrosis. In a series of dogs an attempt was made to fix the spine by threading copper alloy wire through holes drilled through the spinous processes of 3 or 4 vertebrae and reweaving it several times. Immediate mechanical fixation, as determined directly after operation on dogs and on the cadaver, was almost absolute. There was no evidence of destruction or proliferation of bone during the early period while the animal remained relatively quiet. The longer the animal was allowed to survive, the greater was the evidence of bone absorption, pathologically and by X-ray, about the wire and it was most marked in the terminal spinous processes where stress was likely to be most severe. The wire outside the bone was imbedded in new fibrocartilaginous material but showed only a slight oxide deposit. The use of wire as a means of spinal fixation, while efficient immediately, later results in loss of fixation due to rarefaction and necrosis of bone about the wire.—

An Investigation into Wiring of the Spinous Processes as a Means of Internal Spinal Fixation, A. D. Kurtz & M. T. Horwitz, Archives Surg., October, 1936, xxxiii, 630.—(L. F. B.)

Skeletal, Extraskeletal and Joint Tuberculosis.—In the main the 555 cases of joint tuberculosis studied were ambulatory at the time of admission, and all were operated upon. Pathological proof of tuberculosis was made in all but 176 patients where the vertebral bodies were involved so that pathological material was not available. A single negative tuberculin test was recorded in 538 of the cases. Average age of the patients was 17 years. Active pulmonary or bronchial gland tuberculosis was present in 69 cases, inactive pulmonary or bronchial gland disease was found in 199 and no demonstrable pulmonary lesion was found in 287. Twenty-six per cent of 299 cases gave a family history of tuberculosis. The proportion of cases with inactive pulmonary disease or no demonstrable lesion was very high in the first two decades of life while active disease was greater after the second decade. The pulmonary disease associated with joint tuberculosis was relatively benign in character. In only 10 cases could the pulmonary disease be considered as progressive. Tonsils from 100 patients were examined and 24 cases were found tuberculous. Ten of these 24 cases also had pulmonary tuberculosis. There were 13 patients, in this series, with known tuberculosis of the kidneys and 3 with tuberculous epididymitis. Ninety-one of the 555 patients had 123 associated skeletal and nonskeletal tuberculous lesions other than pulmonary disease. Intestinal and laryngeal tuberculosis was rarely encountered. Amyloidosis was encountered in 7 patients all of whom had hip tuberculosis with sinus formation. There were 45 deaths. The true mortality rate in surgical tuberculosis is probably a mean between Cleveland's finding of 28.5 per cent and that of 8 per cent in this series.—*Skeletal and Extraskeletal Tuberculous Lesions Associated with Joint Tuberculosis, G. A. Duncan, J. Bone & Jt. Surg., January, 1937, xix, 64.—(L. F. B.)*

Rib-Splinter Graft in Spinal Fusion.—In a series of spinal fusions by the Hibbs method, the disquieting event occurred in practically every case that when chips of bone were being removed from the tibia, the patient developed a state of shock. To obviate this, sections of ribs in the form of splinters were used. So far, three cases have been treated in this manner. The advantages of this method are slight operative trauma, accessible graft source which supplies cortex, medulla and endosteum for osteogenesis, rapid osteogenesis, and a resulting broad thick graft which is attached to the whole surface of the vertebral laminae.—*Rib-Splinter Graft in Spinal Fusion for Vertebral Tuberculosis, C. K. Petter, J. Bone & Jt. Surg., April, 1937, xxxv, 413.—(L. F. B.)*

Multiple Arthritis and Tuberculosis.—Errors in the diagnosis of cases of multiple arthritis, especially in people who have or are thought to have tuberculosis are very common. To be absolutely sure of the diagnosis the injection into a guinea pig of fluid aspirated from the joint space or a study of biopsy material from the joint should be carried out before the joint is immobilized. Surely a diagnosis of tuberculosis should not be made without a positive tuberculin reaction, and this is not always proof as the patient may have a positive tuberculin and still have a nonspecific arthritis. There are many factors which account for confusion in diagnosis among which are the following: (*1*) insidious monarticular onset of some cases of multiple nonspecific arthritis; (*2*) the coexistence in a patient of some visceral tuberculous lesion which may or may not influence the course of nontuberculous polyarthritis; (*3*) the possible occurrence of a tuberculous joint superimposed upon a nontuberculous multiple arthritis; (*4*) the comparative infrequency of nonspecific arthritis in the hip of patients under middle life and the tendency to suppose such a condition to be tuberculous; (*5*) modification of the course of nonspecific arthritis due to early immobilization; (*6*) the probability that there exists an atypical tuberculous form of polyarthritis-tuberculous rheumatism. To avoid long and useless hospitalization of nontuberculous arthritis, patients should not have their joints immobilized until there is unequivocal evidence of tuberculosis. Roentgenograms alone are not always conclusive enough to take this risk.—*Multiple Arthritis in Presumably Tuberculous Subjects: Difficulties in Diagnosis and Treatment, D. H. Collins & C. Cameron, Brit. J. Surg., October, 1936, xxiv, 272.—(H. W. H.)*

Addison's Disease in the Negro.—This disease probably occurs more frequently in the Negro race than is indicated by the 14 recorded cases (7 in this article), since the laboring class is thought to be most frequently affected and the tuberculosis rate in the colored race is undoubtedly high. Tuberculosis was the aetiological agent in

each of the 11 cases studied at necropsy. All, with one possible exception, died with signs of adrenal insufficiency. Increasing pigmentation had been present for several months in 12 of the cases. Hypotension was pronounced. Anorexia, vomiting, loss of weight, and increasing weakness were prominent features of almost every history. The age range was 21 to 65 years; the average, 44 years. The diagnosis was made in the late, or terminal, stages of disease. The maximum duration of life after diagnosis was 7 months while 6 died within 8 days after hospitalization. The late diagnosis accounts for any difference in the disease seen in white and colored patients.—*Addison's Disease in the Negro, Report of Seven Cases, H. F. Flippin & O. N. Smith, Am. J. Med. Sci., December, 1936, cxcii, 756.*—(*E. M. J.*)

Hypoglycaemia in Addison's Disease.—Hypoglycaemia has been attributed to destruction of the adrenal medulla. An adequate amount of functional adrenal medulla is not incompatible with Addison's disease and probably accounts for the absence of hypoglycaemia in many cases. In each of these two young Negroes dying of Addison's disease, the usual symptoms were present but hypoglycaemia was the outstanding manifestation. Coma developed and was relieved by dextrose administration. Oral administration of 1.5 gm. of glucose per kg. of body weight gave the following, representative, six-hour curve expressed in mgm. per cent: Fasting, 72; one-half hour, 77; 1 hour, 80; 2 hours, 80; 3 hours, 70; 4 hours, 63; 5 hours, 59; 6 hours, 58 mgm. Necropsy revealed that except for the fibrocaseous right renal lymph nodes in one case, the active lesions in both cases were confined to bilateral fibrocaseous tuberculosis of the adrenal glands. In one case, a very few small islands of cortical and medullary tissue remained while in the other case, practically all the cortex was gone but the amount of medullary tissue was not specified. Addison's disease should be ruled out in each case presenting hypoglycaemia. Differential diagnosis must exclude hyperinsulinism and Simmond's disease. Hyperinsulinism does not cause typical pigmentation, hypotension, and the practically flat glucose tolerance curve of Addison's disease; its curve tends to become progressively lower and the patient usually goes into shock before the test is completed. Simmond's disease with a glucose tolerance curve similar to that of Addison's disease is differentiated by its symptomatology; namely, extreme cachexia, loss of sexual function, marked depression of the basal metabolic rate with hypothermia and hypotension, and loss of hair and teeth.—*Hypoglycemia in Addison's Disease, J. W. Welty & H. F. Robertson, Am. J. Med. Sci., December, 1936, cxcii, 760.*—(*E. M. J.*)

Tuberculosis of Stomach.—Hyperplastic tuberculosis of the gastrointestinal tract usually occurs in the region of the lower ileum, caecum and ascending colon where it takes the form of a palpable mass associated with symptoms of chronic intestinal obstruction. Rarely a similar form is found in the pyloric end of the stomach where it is usually diagnosed as carcinoma. A most unusual case affected almost the exact middle of the stomach. It occurred in a 31 year old male who suffered from epigastric distress, nausea, vomiting and loss of weight. Fractional meal showed achlorhydria and rapid emptying of the stomach. X-ray revealed a narrow stomach with a well marked stricture in the middle. Barium meal passed the stricture very slowly and the condition was diagnosed carcinoma. At operation the stomach was found to be small and its wall thickened. There were no palpable lymph nodes. Total gastrectomy was done and examination of the removed organ showed a marked constriction of the middle third due to a granulomatous lesion which, however, spared the serosa. The mucosa presented an ulcer with undermined edges and a necrotic floor. Below the ulcer the mucosa appeared normal and above had the appearance of squamous epithelium. The histological characteristics, while somewhat atypical, were essentially those of hypertrophic tuberculosis. No tubercle bacilli were found. The case is of clinical interest because the patient survived and was in good condition 9 months later.—*Hyperplastic Tuberculosis of the Stomach Causing Hour-Glass Deformity, with Complete Squamous Metaplasia of the Upper Loculus, G. W. Watson, E. R. Flint & M. J. Stewart, Brit. J. Surg., October, 1936, xxiv, 333.*—(*H. W. H.*)

Perforation in Intestinal Tuberculosis.—A woman with minimal tuberculosis of the left lung, positive sputum, was hospitalized on June 8, 1935, with fever of 38°C. to 39°C., emaciation, anorexia, cough and expectoration. No intestinal pain or diarrhoea. Pneumothorax was initiated on the left side, but adhesions prevented satisfactory collapse and symptoms continued. On July 18, about 40 days after admission, patient experienced sudden, but not very intense pain on the right side near the umbilicus. No nausea or vomiting. Semi-

solid evacuation half an hour later. Abdomen distended after this. No elevation of fever. Physical examination showed tympanism of the abdomen, without much tenderness. Two days later the abdomen was more tense and painful, and there was distinct tenderness in the right iliac fossa. An X-ray picture of the abdomen taken at this time revealed elevation of the diaphragm on both sides; a clear space between the right hemidiaphragm and the liver, air between the stomach and the left hemidiaphragm, and complete opacity in the lower part of the abdomen. A diagnosis of intestinal perforation near the ileocaecal angle was made, and operation was decided upon and carried out fourteen hours later under local anaesthesia. On opening the abdomen, a considerable quantity of gas and turbid serous fluid came out, and a perforation 3 to 4 mm. in diameter was found in the small intestine, in the middle of an infiltrated area. The perforation was sutured and the abdomen closed, with adequate provision for drainage. Patient did badly and died three days after the operation. Autopsy showed a free peritoneal cavity with no adhesions between the viscera and the parietal serosa. There were adhesions between loops of the intestine and the perforation was located at a distance of 20 cm. from the caecum. Another perforation, of smaller diameter (1 to 2 mm.) was discovered 30 cm. from the first. Both perforations were surrounded by rather dense infiltrations. There were no strictures; fatty degeneration of the liver; spleen normal. Notable features of this case were the contrast between the limited extension of the pulmonary lesion and the very poor nutrition, and the fact that there were no symptoms of intestinal lesion except anorexia. Tympanism was not marked in the beginning and the pain was not severe. The diagnosis was made mainly from the pneumoperitoneum found through the X-rays. Puncture of the diaphragm with the pneumothorax needle was satisfactorily ruled out as a cause of this pneumoperitoneum, since the punctures had been made at high points in the thoracic wall. Perforations in intestinal tuberculosis usually occur in the ileum. The prognosis is grave and surgical intervention is usually of no avail, since the ulcers are multiple.—*Un nuevo caso de perforación en peritoneo libre por tuberculosis intestinal, A. C. Argaveytia & E. M. Canale, Rev. de Tuberc. d. Uruguay, 1936, v, 269.*—(*J. R. P.*)

Treatment of Intestinal Tuberculosis.—In order to help the organism to gradually overcome the tuberculous intestinal lesions, attention should be paid above all to hygienic methods. Rest and fresh air are likely to improve the appetite. Diet should be controlled and food rich in vitamins such as fresh fruit and vegetables should be prescribed. Intravenous calcium therapy, arsenic medication, and actinotherapy are of great help. In applying the latter only the abdomen and the lower extremities should be exposed while the chest and the face must be protected. In cases where surgery is indicated operations must be performed early in the course of the disease with an internal treatment preceding and following. While the prognosis of intestinal tuberculosis in cases of pulmonary tuberculosis is still serious, statistics of the last decade show a considerable reduction of the number of cases where secondary intestinal involvement occurs in the course of pulmonary tuberculosis. This improvement is probably due to more frequent application of early and successful care of pulmonary tuberculosis.—*Le traitment médical de la tuberculose intestinal des tuberculeux pulmonaires, L. Bonafi, Progrès Méd., May 22, 1937, xxi, 788.*—(*F. G. K.*)

Tuberculosis of Lymph Nodes and Cystic Tuberculosis of Bones.—This is a report of two cases, in sisters, of the rare condition of generalized tuberculosis of the lymph nodes. There were several features of interest. In both children, biopsy examination of an excised node showed the characteristic picture of noncaseating tuberculosis, although inoculation into guinea pigs did not produce tuberculous lesions. However, postmortem examination revealed acid-fast bacilli in the lymph nodes of both children and guinea-pig inoculation of material obtained postmortem produced tuberculosis in the one case where this could be done. One of the children had multiple cystic tuberculosis of the bones, located typically in the bones of the extremities, especially the hands and feet. It is also of extreme interest, from the standpoint of allergy to tuberculin, that in the other child, repeated intracutaneous tests with potent tuberculin were negative. These tests were performed over a period of three and a half years and involved doses of human tuberculin varying from 0.1 to 10 mgm. and of bovine tuberculin from 0.1 to 2 mgm.—*Generalized Tuberculosis of the Lymph Nodes and Multiple Cystic Tuberculosis of the Bones, A. W. Jacobson, J. Ped., March, 1936, viii, 292.*—(*M. D.*)

Calcified Abdominal Lymph Nodes.—This study is concerned with a group of 147 children in whom X-ray revealed the pres-

ence of calcified abdominal lymph glands. In all children who were tested with tuberculin (119) the reaction was positive. Although about 14 per cent showed X-ray indications of intrathoracic tuberculosis (hilum), in only 1 child was there any evidence of activity. About 17 per cent had evidence of nonthoracic tuberculosis (bones, joints, cervical glands, skin, or bowel), which in all cases but one preceded or was contemporaneous with the discovery of the abdominal lesions. Two children, however, died of tuberculous meningitis, apparently arising from an isolated tuberculoma in or near the central nervous system. Seven children had manifest tuberculous peritonitis, which in all cases was present before or simultaneous with the discovery of calcified glands in the abdomen. It appears from the study, that, while glands which are beginning to calcify may disseminate bacilli to the peritoneal surfaces, a child whose roentgenograms show solidly calcified shadows is in little if any danger of peritoneal involvement. There were indications that a frequent source of infection was contaminated milk. About half the children were free of symptoms. The others complained in most cases of mild abdominal pain, occasionally with nausea or vomiting. Occasionally there was low back pain. There was no exact clinical picture to describe from the standpoint of symptoms or physical findings. The treatment of this condition is three fold: (*1*) safeguarding the milk, (*2*) general hygienic care, and, most important, (*3*) establishing an adequate routine of rest. In only 3 children were the recurring attacks of abdominal pain severe enough to consider removal of the calcified nodes. In two of these laparotomy and excision of such nodes was performed with prompt cessation of symptoms.—*Calcified Abdominal Glands in Children, C. A. Smith & F. D. Ames, J. Ped., February, 1936, viii, 205.—(M. D.)*

Incidence of Tuberculosis of Tonsils.—Specimens obtained from 6,280 tonsillectomies performed during the years 1933 to 1935 were reviewed and the results summarized. The technique used in the preparation of these tonsils was that outlined by Weller in 1921. The latter published at that time a review of 8,697 specimens. In both series only one section of each tonsil was examined. In the present series the lowest incidence of tuberculosis of the faucial tonsils was 0.27 per cent in the age group 0 to 5 years, while the highest incidence was 0.78 per cent in the age group 21 to 30. In the age group 6 to 10 years it was 0.53 per cent. In the other age groups the incidence varied from 0.38 to 0.41 per cent. No involvement of the pharyngeal tonsils was noted in specimens from patients over ten years of age. The incidence of tonsillar tuberculosis for the years 1933 to 1935 was 0.44 per cent as compared with 2.35 per cent in Weller's series drawn from the years 1906 to 1919.—*Changing Incidence of Tuberculosis of the Tonsils, M. Catherine Magee, Arch. Int. Med., March, 1937, lix, 445.—(C. L. D.)*

Tuberculous Verrucose Endocarditis.—Tuberculous endocarditis analogous to rheumatic or bacterial endocarditis is rare. Of 30 cases reported in the literature Baker concluded that only 4 could stand the test of the strict criteria adopted. The criteria are: (*1*) microscopic section of the lesions should show a tissue reaction consistent with one of the various tuberculous reactions; (*2*) tubercle bacilli should be demonstrated by staining, preferably in the endocardial lesions themselves; (*3*) other causes for the endocardial lesions should be excluded, for example, rheumatic and pyogenic bacterial; (*4*) demonstration of tubercle bacilli from the blood-stream or the mere presence of widespread tuberculosis should not be accepted as proof that the endocardial lesions are tuberculous. In the light of modern conceptions of endocarditis, Davie believes these criteria may need modification. He presents two case histories together with macroscopic and microscopic figures to support this view. Of the 4 cases selected by Baker as true to type one was Meek's case, which Baker regarded as tuberculous endocarditis analogous to the rheumatic or bacterial type. The findings of Meek (1907) and of Davie (1936) are almost identical as shown by the illustrations and description of the lesions. In the present case the 4 criteria have been satisfied except showing the absence of pyogenic bacteria from the lesions. Tubercles and giant-cells have not been demonstrated, but these are frequently not found in unquestionably tuberculous lesions. Since in gross and histological structure the vegetations are somewhat similar to the valvular condition found in acute endocarditis, the possibility of a coexistent acute rheumatism has been considered. Convincing arguments are given supporting this view. The present allergic conception of the origin of the cardial lesions of acute rheumatism, and the well recognized allergic nature of many tuberculous reactions, as shown by Zinsser and Bayne-Jones, furnish the probable explanation of this type of lesion. Accordingly the lesion in these cases is a tuberculous allergic response in

the subendocardial connective tissue manifested by oedema and a chronic inflammatory cellular response which is aggravated by traumatism along the line of closure of the valves and leads to the beaded row of verrucosities. During the allergic phase, and in the presence of a tuberculous bacillaemia, tubercle bacilli adhere to these vegetations and tuberculous endocarditis ensues. This mode of evolution of tuberculous endocarditis brings it into line with bacterial endocarditis due to other bacteria and makes it possible to explain the histological anomalies of this interesting tuberculous lesion.—*Tuberculous Verrucose Endocarditis, T. B. Davie, J. Path. & Bact., September, 1936, xliii, 313.*—(*S. O. P.*)

Erythema Nodosum.—The incidence of erythema nodosum is much greater among certain races, English, Scandinavians, and German speaking peoples, than among others. It occurs three times as frequently among members of the family or relatives of the tuberculous child who also has erythema nodosum as of those who have a primary pulmonary tuberculosis without erythema nodosum. Thus its appearance depends largely upon the familial constitutional mode of reaction of the tuberculous individual. The frequency of the disease is about the same in boys and girls but it is much greater in adult females than in adult males.—*Endogen Factors in the Occurrence of Erythema Nodosum, A. Roosvall, Acta Tuberc. Scandinav., 1936, Fasc. 4, x, 351.*—(*F. B. S.*)

Treatment of Skin Tuberculosis with a Specially Prepared Tuberculin.—Tubercle bacilli were killed at 120°, dried and pulverized, extracted with acetone, and then dried and pulverized. A tuberculin was made from this powder by grinding it with a 0.2 per cent colloidal lecithin solution so that the emulsion contained one gram of powder to 100 grams lecithin solution. The mixture was then heated under a reflux condenser for 12–24 hours at 60° and shaken in a shaking machine until completely homogeneous. The emulsion was centrifuged, filtered through paper and finally through the Berkefeld candle and preserved with 0.5 per cent phenol. In later experiments 0.1 per cent cholesterol was included with the 0.2 per cent lecithin solution. This preparation gave a stronger intracutaneous reaction than did tuberculin made in the usual way without addition of lecithin and cholesterol. It had good therapeutic effects especially in cases of skin tuberculosis and tuberculids.—*Versuche, tuberkulöse Hautaffektionen mit einem nach eigener Methode hergestelltem Lecithintuberkulin zu behandeln, K. Hedèn, Acta Tuberc. Scandinav., 1936, Fasc. 4, x, 340.*—(*F. B. S.*)

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